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“Hydraulic multi-purpose mowing and cleaning device with a pivoting arm”

The invention refers to a circularly, pivoting, flexible, preferably a buckling arm used as a furnished arm; hydraulically operated, multi-functional mowing and cleaning device with a radial arm to which several tools can be attached.

For maintaining street curbs, ditch slopes, rail borders, the riverbeds and pond beds, you need attachments to perform a variety of these different tasks. That is why it is necessary, for example, to mow the grass, to rake, to collect, to pick up and to dispose of the material,

Cut hedges, and, if need be, also to undertake soil treatments such as excavating ditches.

From the German Patent 1 634 699 a device for cleaning ditches is introduced, which enables a spider like crossing of obstacles, for example of square ditches, pasture fences, bridges and such.

From the German Patent 2 159 944 a device is introduced, which is described as a vacuuming - mowing device, which transports the combined material from the mowing and vacuuming device over a flexible suction spout into a collection carriage.

From the DF-OS 1 963 136 a slope, mowing and cleaning device is introduced, which enables to combine the mowing, collecting of grass and bush edges and which pushes the mowed and combined material through a blower into a collection carriage.

All these devices are minimally designed with a, on the base frame pivoting, buckling arm, on which the storage unit is partly turned away from the end, so that attachments can be connected.

The invention at hand has the purpose, in development of these known devices, to create a more

universal use of the device and to create a base unit, which can be utilized for any use, possible without a big rebuilding effort.

The purpose of the invention at hand is solved by designing a swivel, from the arm-bearing base, which is a hollow block, and at the same time serves as the tank for the hydraulic liquid.

Because of this measure, a strong unit will be created, which is designed as a buckling arm, constructed on a base plate, which also can be installed on a ship, or with an undercarriage, on a railroad car or to be mounted on a truck or training as a self-driver is possible. The required stability for this base plate is achieved by designing this base plate as a hollow block. The possible use of the hollow block is as a tank for the hydraulic liquid. Since the various attachment need to be attached at the end of the arm and the functioning of these devices is completely hydraulic, a relatively large amount of hydraulic fluid is required, which, because of the required high performance of the device, relatively heats up fast. The use of the base plate as a tank creates

a large tank surface and at the same time a tank with a large capacity, and with that, a big cooling potential, so that a large oil quantity is secured and the hydraulic liquid does not overheat itself, but will automatically, continuously and sufficiently be cooled through the use of the tank-like constructed base plate.

Furthermore, the usage of the hollow block as hydraulic tank enables that the top of this base plate of the circularly, pivoting arm is kept free of interfering with the additional components. With the, up to now, known devices was on top of the attachment of the arm, a skeletal structure, a, for example, on a base plate or such constructed tank, which served for the intake of the hydraulic fluid with which these tanks, of course, limit the unobstructed movement and the size of the pivot radius of the arm. As per the inventions instruction, it is possible to turn the arm 360°, because the top of the base plate can be kept free of additional attachments.

On the base plate can, on top of the appropriate attachments, carriages be designed. The base plate can, without problems, be built-in on a, for example, river cleaning ship and can be mounted onto a truck in the same way. The drive propulsion of the hydraulic pump occurs in a known way, for example over a power take-off propulsion but can in the same way be done with an own electro or combustion engine.

According to a preferred embodiment of the invention the swivel of the arm is constructed within a hollow body, so that on one side, the stability of the hollow body is guaranteed and on the other side the heavy strained swivel then receives the urgently needed stability, and with it the stableness for whole device. Furthermore is the dirt sensitive arm protected against the penetration of debris.

The propulsion for the rotation of the arm occurs according to the implementation schedule of the invention, preferably with a hydraulic cylinder operated cog rail propulsion and with a cog rail combing cog wheel at the low end of the arm.

The operator's stand is for the movements of the arm and for the operation of the, at the end of the arm attached attachment, preferably connected to the arm and is carried by it, so that the operator, with every rotation or pivoting movement of the arm, always looks at the end of the buckling arm and with this can operate the attachment of this bucking arm in a proper way.

An implementation example of the device, according to the invention will be explained with the following diagram. The diagrams show in fig. 1 graphically a view of a device corresponding to the invention, in

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fig. 2 a view of the direction of travel of the device and in fig. 3 a top view on the new device.

In fig. 1 is the actual base plate described, which is shown as a hollow body and with it, portraits the tank for the hydraulic fluid. At the front end of the base plate 1 and below it is a gearbox 2 designed, which holds the required hydraulic pump or such. The propulsion of these pumps is being explained with a performance example over cam shaft 3. Furthermore a carriage with traversing wheels 4 is planned with the described performance example, at the end of the base plate 1, and on the front end a connection device 5 for an extension for a pulling device is shown.

Of course can the base plate 1 also be constructed as a self-driving device or can be built on a bearing device, as for example a boat, a railroad carriage or a truck.

On the top of the base plate 1, an arm 6 has been planed, which bares a buckling arm 7, to which, on the front end, an attachment 7 is connected. The arm 6 is pivotal and designed on the base plate 1; the arm on the drawing is not recognizable, because it is designed to be inside the base plate and to strengthen it. The pivot action of the arm 6 occurs

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over a cog bar propulsion 9, which combs with a cogwheel 10 and can be moved back and forth over a hydraulic cylinder 11. Correspondingly with the length of the cog bar propulsion 9 a 360° pivot movement of the arm can be achieved without any problems.

The movements of the buckle arm 7 and the tilt movements of the arm 6 are being achieved through hydraulic cylinder 12 and 13, as well as the steering of the actual device 8 can be achieved over one or more hydraulic cylinders 14.

With 15 is a pressure hose described, that takes the from the device collected material to a carriage or such.

To arm 6 is the actual operator's stand 16 firmly attached and operates the pivot movements of the arm, of which the operator's stand carries the required controlling equipments 17 for the operation of the various power units.

As attachment 8 is, with the shown executing example, a chipper 18 designed, which transports its cut material through a tunnel 19 to a blower 20, which could be combined with knives and which blows the material through the pressure hose 15.

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Instead of device 8, a mowing blade or another device can also be attached, for which only the connection part 21 on the end of the arm and on top of the device has to be loosened.

Because of the size and the flat form of the base plate 1 and with that the size of the tank, on one side a sufficient cooling of the hydraulic fluid in the tank is achieved, on the other side a good weight distribution and stability of the arm of the total device is provided.

Because shaping the base plate 1 as a hollow body, the required stability of the base plate is achieved and at the same time a very large oil quantity is available and at the same time is the top of the base plate of the hydraulic tank or such free, so that the pivot movement of the arm is in no way limited.

From the description in fig. 1 and 3 the functioning and the propulsion of the device is recognizable, without any necessary, special explanations. In addition to the description in fig. 1 is from fig. 3 the loading cart 22, for the intake of the in the device 8 collected and over

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the pressure hose transported material, recognizable.

Patent claims:

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